

3: Using Heart Rate Guidelines for Running

The marketing of Polar and other brands of heart rate (HR) monitors has both helped and confused a lot of endurance athletes. The aggressive marketing makes you think that you NEED a heart rate (HR) monitor, not just A HR monitor, but the BEST (and most expensive) HR monitor. But many people purchase a monitor and:

1. Don't know how to use them because there are so many functions on them
2. Try to follow the "target HR set for them" and find that it doesn't correlate to how they feel (ie. You are supposedly training in your "zone" but the pace still feels easy; or you can't sustain training in your "zone" because it is really hard for you)
3. Get so utterly confused that they stop using them!

Most of the questions people ask me during my lactate threshold testing or training consultations revolve around the idea of heart rate training & heart rate training guidelines. You are not alone if you are a little confused!!!

I do NOT think heart rate monitors are NECESSARY for physical activity or endurance exercise, but do view them as great training tools. They can help endurance athletes in the following ways:

1. Provide clear concise training zones (if training zones are obtained correctly – see below)
2. Help conservative athletes know how hard they SHOULD be pushing themselves when they do threshold or VO2 max intervals (3-10 minute hard intervals) and in races.
3. Help "Type A", overenthusiastic endurance athletes know how SLOW they should be doing their long runs at ie. It is not beneficial to be "red-lining" (running at threshold) every single run of the week!! Help these athletes find a target for racing
4. Help detect training improvements and therefore provide motivation for beginners
5. Help detect signs of fatigue or overtraining

The following information will help you understand a bit more about using heart rate training guidelines for your running.

Heart Rate is simply a way to measure run INTENSITY

Some methods of measuring running intensity include:

<p>Run Velocity or pacing (on a treadmill or by running a known route/distance)</p> <p><i>*GPS devices now on the market-give you distance & run velocity & altitude for any routes. Con? Expense!!</i></p>	<p>Pros: Very accurate & direct – either you can run that pace or you can't</p> <p>Cons: Influenced by terrain/environment</p> <p>Boring to run same route daily & hard to measure every run that you do</p>
<p>Blood Lactate Testing</p>	<p>Pros: Gives an accurate picture of what is happening in the muscles (ie aerobic or anaerobic energy metabolism)</p> <p>Cons: Baseline lactate fluctuates daily; inconvenient & impractical; invasive (blood sample)</p>
<p>Rate of Oxygen Consumption (submax & maximal VO2 testing)</p>	<p>Pros: Very accurate measurement of run economy/efficiency at various speeds</p> <p>Cons: Hugely expensive, inconvenient, impractical</p>
<p>Heart Rate</p>	<p>Pros: Practical & convenient</p> <p>Cons: Fluctuations may moderately affect training zones (see below)</p>

Heart Rate may be influenced by the following factors:

- Caffeine (↑resting & submax HR) & certain medications
- Stress levels (may elevate resting & submax HR)
- Aerobic fitness changes (↑fitness will ↓ HR at rest & submax levels)
- Heat (will elevate HR vs exercising in the cold)
- Altitude (Min 1500 m) (will cause a higher HR vs same speed at sea level)
- Fatigue & Overtraining (may elevate OR depress resting and submax HR by approx 10%)
- Body weight changes (↓ weight may ↓ submax HR while running)
- Length of race/training run (“cardiovascular drift” means gradual ↑ running HR after running 1 – 1 ½ hrs – due to core body temp increase & decrease in blood plasma levels associated with water loss.)
- The mode of exercise you are following!!! Running training zones may be up to 10% higher than for cycling and swimming. Nordic skiing training zones may be higher than running!!!

How To Find Your Target Heart Rate

This is where the confusion often begins!! There are many different formulas, and sometimes the formulas don’t “work” for an individual. The following chart outlines some methods of determining target heart rate.

	Method	Pros/Cons to this Method
Age-predicted max (charts found on most CV equipment and many HR monitors)	$220 - \text{age} = X$ $60 - 90\% X$ gives “zone” eg. 40 yr old person Target zone: 108-162 bpm	Method accurate for 60% of population. SD is 10-12 bpm, meaning if it predicts your max HR is 180 bpm then your max HR may actually range from 168-192...Not very accurate!
Max HR testing *only do if you are cleared for max exercise and are accustomed to fast running. *Once you have heart rate max then you multiply by 70 – 90% to obtain target zone)	Method 1: Warm up well, run up gradual hill as fast as you can for 5-7 mins (or simulate on treadmill) Method 2: Do an incremental test in a laboratory on a treadmill	More accurate than using Age-predicted max; should be done with a qualified trainer to make interpretations correct. Lab tests can be expensive.
Karvonen (Heart Rate Reserve) HRrest should be taken when you wake up and before you get up in the am!	$(\text{HRmax} - \text{HRrest}) \times .60 + \text{HRrest}$ (x .60 and .80 gives 60-80% Heart Rate Reserve)	Probably the most accurate heart rate zone determination of the above methods because it takes your resting HR into consideration.
Lactate Threshold or similar Test* with or without oxygen consumption testing	Must be done by qualified tester. Involves an incremental run test, blood lactate determination & HR monitoring	Most accurate method if done by experienced tester. Can be expensive.

Serious Trainer? These zones are very specific if you are more experienced & plan on training across the whole intensity spectrum: * E1 = Recovery (50-60% max HR) * E2 = Aerobic Zone (65-80% max HR) * E3 = Tempo (80-85% max HR) * E4 = Threshold (85-90% max HR) * E5 = VO2 max (95-100% max HR)	Description Recovery btwn intervals; training more than 4-5 days/wk Majority of Miles Slightly faster than comfy - 10 – 45 mins. 5-10 min intervals. 1:1 or 1:5 W:R ratio. HURT! 1-4 min intervals: 1:1 OR 1:5 W:R ratio. HURT!
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The Final Word

Using heart rate can be valuable to your training. However, you need to take it with a “grain of salt” and not let it confuse you. If you compare your heart rate with how you feel while running and racing, and it can provide valuable information to your running.

References

1. ACSM's Guidelines for Exercise Testing & Prescription (2000). ACSM. 6th Ed. Lippincott, Williams & Wilkins, Philadelphia
2. McArdle, Katch & Katch (1994). Essentials of Exercise Physiology, Lea & Febiger, Philadelphia